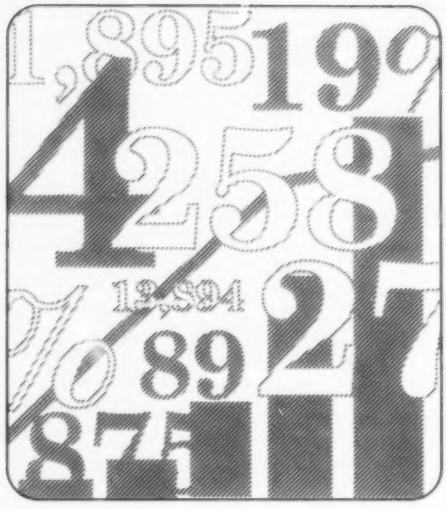
Canadian Centre for Occupational Health and Safety

Centre canadien d'hygiène et de sécurité au travail



WORK INJURY STATISTICS

How to Understand and Use Them

P90-18E

by
Wendy E. King

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How to understand and use them

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by
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1. INTRODUCTION

What are the most common causes of fatal accidents in construction? How many hospital nurses were compensated for back injuries over the past five years? Have serious farm injuries due to tractor roll-overs been reduced by the use of roll-over protection in the past ten years?

Such questions are basic to occupational health and safety. We ask them to find out the nature and extent of a problem. And we ask them to determine if preventive measures are working.

But simply quoting a few numbers is not enough. It is essential to understand what the numbers mean, and to know how to use them to uncover health and safety problems at work. It also helps to know how reports on injury statistics are produced, and to be ready for the possible pitfalls in reading and understanding them.

That is what this publication is about—helping to create better awareness and understanding of the numbers used to describe work injuries.

2. WHAT WORK INJURY STATISTICS ARE

An understanding of the words used to talk about injury claims and statistics is a good place to start.

A "work injury" or a "work-related injury" refers to any injury, disease or illness suffered as a result of work. A work injury can be anything from a minor cut to a fatal fall. It can refer to a temporary illness or to a permanent disease. (Appendix A provides more definitions.)

In Canada, work injury statistics usually mean those numbers derived from Workers' Compensation Board (WCB) claims reports. These numbers represent claims which have been reported to, or accepted by, the WCB as compensable occupational injuries, diseases or deaths. The number of working days lost due to a disabling injury is another measure based on work injury statistics. As well, it is sometimes possible to find out the number and type of claims rejected by the WCBs.

Other organizations, including private companies, trade unions, health and safety associations, government departments and research agencies, also produce and distribute work injury statistics. Their data may be somewhat different from WCB reports, but are generally based on the same claims.

Not Accidents or Causes

Work injury statistics available from the WCBs are about the *injuries* which may result from accidents and dangerous conditions. *However, they do not represent accidents or the causes of accidents.*

The WCBs need information primarily about injuries in order to settle compensation claims. However, most WCBs in Canada do not have the prevention of injuries as part of their stated objectives. *Therefore most boards are not required to collect and analyze all the information that would help to make effective preventive decisions.* Changes in the responsibilities of the WCBs, such as the new Ontario health and safety agency, may make injury analysis and prevention a higher priority.

In most provinces the Workers' Compensation Board does not record and analyze

information about the underlying causes of accidents at work. Part of the reason for this is that the only coding system in common use puts strict limits on the amount and type of information that can be recorded. (This system is the much-criticized American National Standards Institute Standard Z16.2. For further information on the inadequacy of the ANSI codes refer to "Understanding and Making Effective Use of Statistics" in the 1987 Corpus *Occupational Health and Safety Management Handbook*, p.172-85.)

It would be a good thing if information systems could describe the *causes* of accidents as clearly as they describe the resulting injuries. There is agreement among people concerned about work injury data that it is far from adequate to be recording only injury details. They believe the *sequence of events* before the accident or the conditions leading to the injury would explain the real causes.

Here is an example of a sequence of events which could be coded in a statistics system to indicate the real causes of the injury:

> A computer-operated pressure control system is installed and workers with responsibility for using it are trained to operate it. However, they are not trained to react quickly and effectively if a malfunction occurs. No emergency plan is in effect at the plant to prepare all workers for a malfunction accident. One day an employee is fatally injured because of an explosion at the plant caused by a fault in the computer system. The sequence of events leading to the death began with the lack of staff training in preparation for a possible computer malfunction.

At present there are no recording systems in common use capable of capturing and coding this type of background information.

Of course, some companies and government inspectors produce accident investigation reports. These reports can be very valuable for individual companies. But again there is no system to collect and analyze accident investigation reports on any large scale.

Types of Work Injury Claims

The classification of claims by the WCBs into lost-time and no-lost-time, and fatal and non-fatal, is not fixed. As a claim goes through various stages, the status can change.

Lost-Time Injuries - prevent employees from performing normal work. These injuries are also called Time-Loss or Disabling Injuries.

No-Lost-Time Injuries - are those where no work time is lost beyond that required for medical attention. They are also called First Aid, Medical Aid, Health Care Only, or Non-Disabling Injuries.

Modified Work Programs - In practice, some injuries which in fact prevent an employee from doing the normal work may not be recorded as Lost-Time Injuries because some employers are setting up Modified Work Programs to return injured employees to work in some capacity.

It would be useful if statistics reports included information about disabled workers on Modified Work Programs. Otherwise standard Lost- Time Injury statistics will indicate a lower level of work injuries than actually exist. This in turn could distort a true assessment of where there are hazards, and where improvements are needed.

Some reports under the Nature of Injury description divide WCB claims into two groups: Traumatic Injuries, and Diseases or Illnesses.

Traumatic Injuries - are immediate physical injuries. They include amputations, broken bones, burns, concussions, cuts, drowning, electrocutions, hernias, sprains, etc. Back injuries are normally included in this group under "sprains or strains."

Occupational Diseases or Illnesses - can be short or long term, minor or serious disabilities. They include chemical burns, dermatitis, hearing loss, infections, repetitive strains, poisoning, radiation effects, etc.

Even though they are the most serious injuries, work-related death statistics are not the easiest to understand.

Fatalities - or Fatal Injuries, or Fatals, may be included in injury reports in the Traumatic Injuries and Diseases lists. It would be better to list them separately by specific cause. The number of workers who die in a year because of a fatal accident or injury due to work is one type of Fatality statistic. Another type is the number of WCB claims accepted by the WCBs in a year. These are two different measures based on an administrative difference of when a claim is settled. [For more on Fatality Rates in Canada, see CCOHS Statistics Infogram 02 (1989) and page 9 of this publication].

Non-Fatal Injuries - may include Temporary or Permanent Disabilities. Some WCB tables show only the Temporary ones.

Figure 1 shows the basic types of Lost-Time or Disabling Work Injury claims. When reading or discussing work injury statistics reports, it is helpful to know about the different types to avoid confusion.

Figure 1 - **Types of Lost-Time or Disabling Injury Claims**

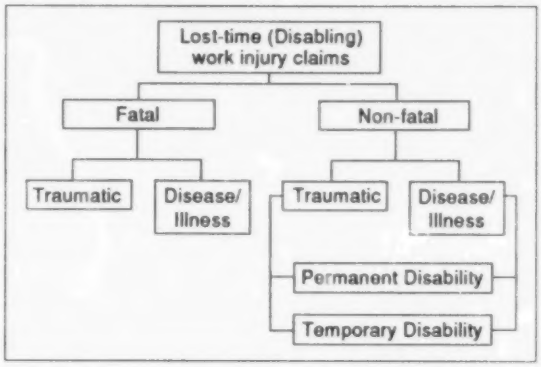
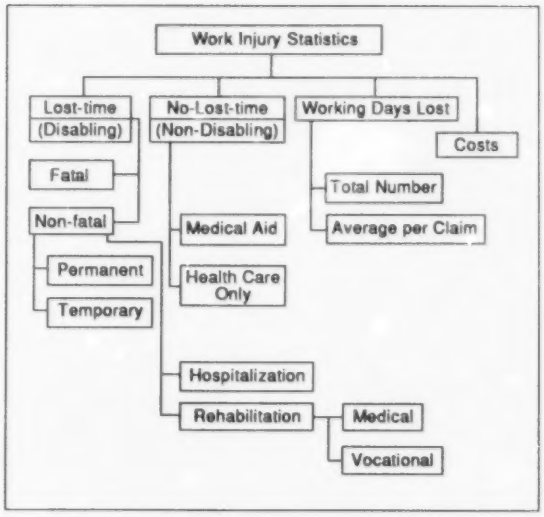


Figure 2 - **Basic Types of Work Injury Statistics**



Counts and Rates

Counts are simple statistics that can answer questions such as:

- How many working days have been lost due to musculoskeletal strain among grocery cashiers? or
- How many firefighters die of heart attacks due to work in one year?

Rates are generally more useful statistics than counts. They can measure the level or extent of injuries within a group of workers or within a period of time. Rates can answer questions such as:

- On average, how many working days were lost due to musculoskeletal strain among grocery cashiers, for every 100 days worked? or
- How many firefighters in every group of 1000 working die of heart attacks due to their work?

Chapter 4 and Appendix C in this publication have more information on how rate statistics are calculated.

3. TYPES OF REPORTS THAT PROVIDE WORK INJURY STATISTICS

Any group trying to reduce the number or frequency of injuries at the workplace needs information. Group members can record and study their own organization's injury reports, and they can get outside information. Usually the more specific these reports are, the better.

No single report presents everything worth knowing about work injury statistics for Canada. Both labour and management groups have serious concerns about using only WCB statistics because they sometimes under- represent the actual level of injuries.

Use any helpful information from any reasonably trustworthy source on the question at hand. There are many valuable documents available, but not all sources are complete or reliable.

Some statistics reports are better than others. Some explain their sources, and say exactly what the numbers mean, while others are annoyingly vague. Some are free of charge, and some are available at a cost. Librarians can usually help by locating reports.

Be skeptical about the presentation of numbers that are not explained, especially from organizations having a particular economic or political bias.

Speaking with the author or someone familiar with the content of a report can help to confirm what the numbers actually mean.

This chapter gives examples of the types of organizations and reports that can provide work injury statistics.

Industry Health and Safety Associations

Every year various industry health and safety associations publish their annual reports. Some editions of these reports have detailed WCB work injury and fatality statistics. Others offer very few useful details.

Some associations go beyond the WCB statistics by doing studies of their own industry's injury record. [See Appendix B for names of such associations.]

A good example is the Farm Safety Association Inc. (FSA), which in 1987 reviewed ten years of Ontario farm fatality records. The Association produced a four-page factsheet containing information valuable for targeting serious hazards in the agricultural industry. Figure 3 shows the kind of useful detail found in the FSA's fatality statistics report.

Workers' Compensation Boards (WCBs)

Employers may obtain a one-page summary of their company's recent work injury statistics from the WCB. Some provinces call this summary "the firm profile."

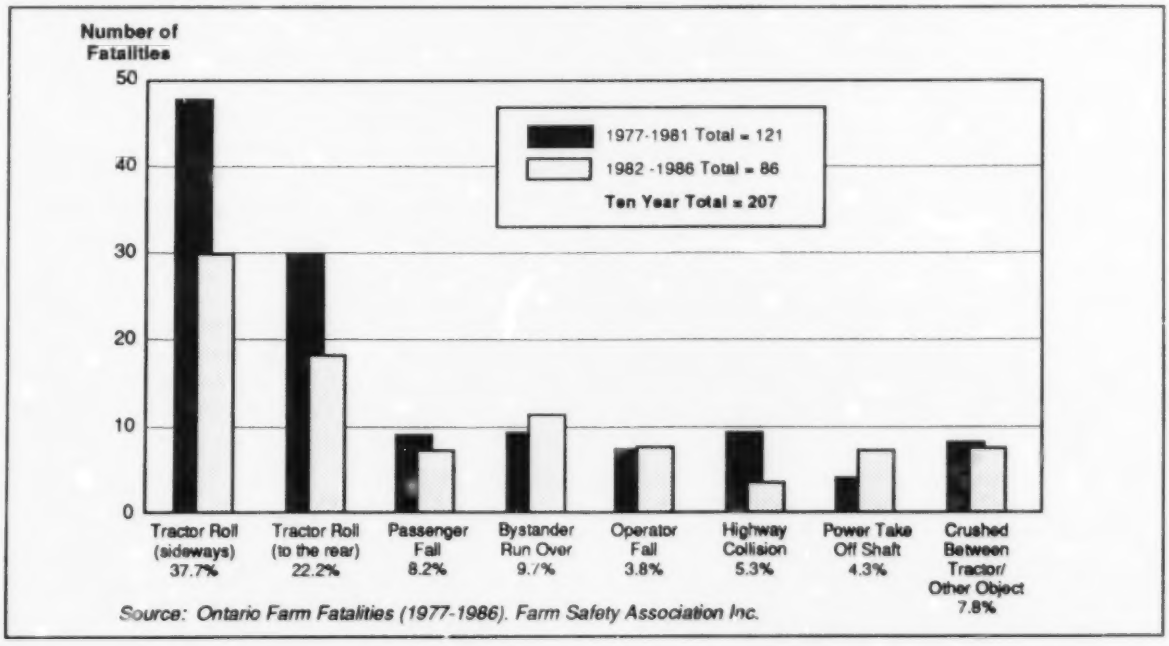
Most WCB's can also provide a company's annual summary of injuries and diseases, upon written request from "a responsible official" designated by the company. In general, these reports give no rates, just basic counts and simple descriptions of injury.

Every year each provincial WCB publishes its own annual report. These have widely varying amounts of useful statistical data on work injuries. Some boards also make available, on request, unpublished but quite informative tables of statistics. These tables show numbers of claims, costs, days lost, and types of injury such as fatal, permanent or temporary disability, by occupation and industry.

Many WCB's publish their own original study reports analyzing injury statistics (as in British Columbia), while others provide data for external research agencies to analyze (as in Québec), and to other government departments (as in Alberta).

In some provinces, the WCBs publish detailed statistical supplements in addition to

Figure 3 - **Ontario Farm Fatalities (Tractor-Related)**



Source: Ontario Farm Fatalities (1977-1986). Farm Safety Association Inc.

their annual reports. Both the British Columbia and Ontario WCBs provide copies of these detailed reports on request. Explanations in these supplements can be very helpful in understanding how to interpret the statistics, as Table 1 demonstrates.

NWISP reports have not in the past presented statistics on Fatalities, Injury Rates, or Working Days Lost. But they are becoming more informative with each annual edition. They provide the most detailed national work injury data available by specific industrial and occupational groups. Special custom-made tabulations can be arranged with NWISP on a cost-recovery basis.

Table 1 - **Occupational Fatalities 1984-1988 (Ontario)**

Year of Death
The fatalities figures below are given by year of death, meaning that when a fatal claim is allowed, it is assigned to the year when the worker died, regardless of when the claim was made or allowed.

Fatalities of Gold Miners with Lung Cancer
A new policy was implemented in November 1987 to compensate gold miners with lung cancer. Since these fatal claims are also assigned by year of death, the figures are subject to change as more claims become allowed.

	1984	1985	1986	1987	1988
Fatalities, excluding deaths of gold miners with lung cancer	247	202	214	249	285
Fatalities of gold miners with lung cancer	12	7	7	4	8
Total	259	209	221	253	293

Source: Statistical Supplement to the 1988 Annual Report. Workers' Compensation Board, Ontario.

Statistics Canada

The National Work Injuries Statistics Program (NWISP) at Statistics Canada obtains compensation board statistics from all jurisdictions on all time-loss injuries and illnesses accepted by the WCBs. Data is available in a "time-series" from 1982 onwards. Every year since 1986, the NWISP has published three years of standardized work injury data at a time, in the publication *Work Injuries*.

The "standardized" aspect of this program is very important. This means that before NWISP publishes, it tries to ensure that the injury statistics are coded in a common and consistent manner from each separate source. The numbers published are basic counts shown by jurisdiction and by categories such as nature of injury, source of injury, type of accident, occupation and industry.

Labour Canada

Labour Canada's Occupational Safety and Health Branch publishes tables and graphs of WCB work injury statistics in the publication *Employment Injuries and Occupational Illnesses*. Table 2 shows an example of cost data. Other tables present Fatality Counts and Rates, Disabling and Non-disabling Injury Counts and Rates, cost details and average costs per claim, and Injury Frequency Rates covering a ten-year period. They also provide national, provincial and federal jurisdiction statistics, including comparisons. Publication dates remain unpredictable, however.

Table 2 - **Work Injury Cost for Canada 1983-1987P**
(In Thousands of Current Dollars)

Year	Medical Aid	Pension	Compensation for Lost Earnings	Total Payments	Total claims	Payment per claim
1983	417,243	700,189	1,100,515	2,217,947	953,885	2.33
1984	447,304	833,956	1,206,980	2,488,240	1,036,344	2.40
1985	502,271	899,541	1,329,593	2,731,405	1,075,773	2.54
1986	566,119	1,017,965	1,666,771	3,250,854	1,073,813	3.03
1987P	629,685	1,118,771	1,791,073	3,539,529	1,034,902	3.42

Source: Table 2.1 (Excerpt) in Employment Injuries and Occupational Illnesses (1976-1987). Labour Canada, 1990.

Research Agencies and Government Departments

Government departments and other agencies with responsibility for occupational health and safety publish annual reports and research which summarize recent past and previous years' injuries. They sometimes provide useful explanations about the economic or political background to the statistics. There is a lot of variation in these reports, but they often present work injury statistics not available elsewhere. These statistics include counts of inspections, refusals to work and rehabilitation.

One of the most prominent Canadian research agencies producing work injury statistics is the Institut de recherche en santé et en sécurité du travail du Québec (IRSST), Quebec's health and safety research institute. IRSST publishes detailed statistics by occupation and by industrial economic sector.

From time to time provincial governments commission in-depth reports on serious or controversial health and safety threats. Examples are the reports on hydrogen sulphide-related deaths in Alberta (from Occupational Health and Safety Alberta), and lung cancer among gold miners in Ontario (from the Industrial Diseases Standards Panel).

Special project reports done by government departments may contain useful occupational health and safety statistics. But these reports may not be widely known outside the official group with direct responsibility for the report.

An example is the reply of the Government of Canada to the International Labour Office questionnaire on mining accidents and diseases in 1989. This 95-page document contains many informative statistical tables, including frequency and severity rates, and suggested explanations for the numbers. The following is an excerpt from this document.

Table 3 - **Occupational Health Problems**
CSST 1978-82

The Commission (CSST) received 1,561 claims for compensation for the four years from 1979 to 1982. Only 350 claims led to compensation, or 22% as against 78% rejections. For example, 96% of claims for compensation for pneumoconiosis (respiratory disease) were rejected. The large number of claims stems from workers' insecurity in the face of the silicosis and asbestosis problems of the 1970s. The principal diseases to be noted are as follows: Deafness 70%, Pneumoconiosis 5%, Poisoning 8%, Dermatosis 5%.

Source: Reply of the Government of Canada to the International Labour Office Questionnaire in preparation for the Fifth Tripartite Technical Meeting for Mines other than Coal Mines. Geneva, 1989.

Employers

In general, large employers such as oil, gas and hydroelectric companies produce their own statistical reviews. Some reviews are for internal use only, while others are available to the public.

Ontario Hydro's Health and Safety Performance report presents and explains its statistics clearly. It describes work injuries by occupational trade groups, such as mechanics, foresters, pipefitters; by energy field such as mechanical; and by type of accident and injury. Specific tasks and jobs can be highlighted to find problems.

The Hydro report also presents statistics in more detail on special injury causes such as motor vehicle accidents and fires. In the 1987 report, Ontario Hydro took particular care to explain hearing loss claim statistics, as Table 4 shows.

Table 4 - **Summary of Industrial Hearing Loss Claims Initiated in 1986**

Number of Claims Accepted by the WCB	Health Care	59
	Disability Pension	30
Number of Claims Rejected by the WCB	Insufficient Hearing Loss	31
	Insufficient Noise Exp.	11
	Claims Closed by the WCB	2
	Claims Outstanding at the WCB	54
Total number of Claims Reported to the WCB		187

Noise is the most prevalent occupational health hazard in Ontario Hydro. The number of claims submitted reached its highest level in 1986, mainly because of initiation of the Regions Branch Hearing Conservation Program and subsequent audiometric testing of all noise-exposed Regions Branch employees.

Though the high number of claims may cause concern regarding the effectiveness of our noise control program, it must be remembered that current claims are due to noise exposures over the last 20 or 30 years, and are merely picking up those employees who have had occupational deafness for many years and it has gone either undiagnosed or unreported. The trend of hearing loss claims over the next five years will be crucial in determining the success of our current programs.

Source: Excerpt from Ontario Hydro Health and Safety Performance 1987. (HSD-HSP-87). Health and Safety Division, Ontario Hydro, 1988.

4. USEFUL TYPES OF WORK INJURY STATISTICS

Identifying useful work injury statistics depends on knowing what information you need. If it is enough to know, for example, how many hospital nurses suffered disabling back injuries in a five-year period, then a simple count of lost-time claims is adequate.

But if a health and safety committee needs a clearer understanding of the trend or extent of back injuries among nurses, a rate of some kind may be the answer. The following example explains this.

Suppose the number of fatalities in the construction industry of a Canadian province is 38 in 1978, and 39 in 1988. Does this mean the rate or risk of fatal injuries has remained constant? No, it does not.

Because:
- in 1978 there were 220,264 workers
- in 1988 there were 309,792 workers.

Therefore, the fatality rate actually went down from 17.3 per 100,000 workers in 1978 to 12.6 per 100,000 workers ten years later.

Rates

A rate is a statement of risk expressed as a kind of fraction. If the number of employees who were injured is divided by all the employees in the exposed group who could have been injured, and then multiplied by 100 (to get a percentage), a rate is the result.

Example:

$$\frac{\text{no. of injuries} \times 100}{\text{number of exposed employees}} = \frac{40 \text{ back injuries} \times 100}{800 \text{ nurses}} = 5 \text{ back injuries per 100 nurses}$$

Different types of rates can measure things in different ways, such as:

- Incidence - how many injured workers there are in a group of workers exposed to the same conditions or potential hazards
- Frequency - how many injuries occur in a period of time
- Severity - how serious injuries are, in terms of working days lost, length of recovery time, or cost per claim.

Injury rates can address more complex questions such as "Have the number of working days lost due to back injuries among

hospital nurses increased or decreased over the past five years?"

These are examples of statements of injury rates:

- 57 out of every 1,000 employees in Canada had a disabling injury in 1986. *(incidence)*
- 40 back strain injuries per 2,000,000 hours of employment occur in a manufacturing industry. (*frequency*, based on 1,000 employees in 1 year).
- 9 injuries per 100 man-years in the airplane manufacturing industry are forecast for 1990. (*frequency* prediction.)
- 136 working days are lost on average, for an occupational asthma claim. (*severity*)
- 89% of fallers/buckers have had one or more lost-time injury. *(incidence*, stated as a *percentage*.)

How Rates Can Help

An understanding of how often particular injuries occur among specific occupational groups can add critical information to the process of deciding which problems should get priority action.

Knowing the number of employees exposed to hazards, or the number of total hours worked (called man-hours, employee-hours or person-hours) allows for comparisons. But the frequency of injuries measures only how often they happen. The severity of injuries and their impact upon all concerned is perhaps even more critical. Severity can be measured as days lost per injury, days of compensation charged, or dollar cost per injury.

Using incidence, frequency or severity rates, it is possible to find out if there is any pattern or trend in work injuries over a period of months or years.

A health and safety committee could do this by department to see if any high rate problem areas show up. If so, they may be related to changes in exposure to hazardous conditions, job requirements or to some other factor.

For example: If Department ABC has one case of carpal tunnel syndrome for every seventeen workers, while Department XYZ has two cases for every seventeen workers, this means the chances of developing this type of injury are twice as high in XYZ as in ABC.

Comparisons can also be done using an external worker group or industry. Using rates, Table 5 demonstrates how one industry's fatal injuries compare with all other industries.

Table 5 - **Occupational Health and Safety Division Fatality Rates**
Alberta, 1982 - 1986

	Construction Industry			All Other Industries
Year	Number of Fatalities	Estimated Man-Years	Rate per 100,000 Man-Years	Rate per 100,000 Man-Years
1982	22	105,057	20.9	6.3
1983	12	79,348	15.1	3.6
1984	13	63,294	20.5	3.6
1985	9	63,283	14.2	4.3
1986	11	61,757	17.8	3.8

Sources: Occupational Health and Safety Division Fatality Investigation Data Base, 1982-1986. Occupational Health and Safety Division Report WHOH6102, 1986. Man-year estimates are based on wage and payroll data submitted to the WCB. Partial representation of original table.

The More Specific the Better

The injury records and statistics which seem to be the most useful are those which can pinpoint specific practices, tasks, hazards, or conditions causing the most severe or most frequent injuries.

It may be obvious which jobs are most risky in smaller operations. But in larger companies, a look at the work injury rates by occupation or group department is one good way to find the procedures, tasks, exposures, or use of equipment responsible for a high rate of injury.

Table 6 shows what some forestry workers in B.C. consider to be the most serious equipment-related problems they encounter. Higher percentages reflect greater concerns.

Table 6 - **Equipment Factors that Cause Discomfort or Concern for Various Machine Operating Jobs**

	Percentage of Operators Responding		
Equipment Factor	**Yarding**	**Machine Operators**	**Loading & Hauling**
Seating	30.5	46.7	39.5
Cab dimensions	18.6	16.7	21.1
Visibility (to ground and work)	23.7	18.3	26.3
Noise	33.9	18.3	39.5
Climate in cab (temperature)	33.9	53.3	50.0
Ventilation (exhauset emissions)	23.7	10.0	28.9

Source: Ergonomics in British Columbia Forestry and Logging Operations. B.C. Research Corp. for the Forest Industry Health Research Program, October 1988. P. 72 (excerpt).

Impact: Days Lost and Costs

Any joint committee faced with the task of justifying a prevention- related health and safety expenditure will probably realize the value of having information on the severity and cost of injuries.

A committee can obtain data to measure and compare the impact of work injuries according to:

- the number of Working Days Lost in total
- the average number of Working Days Lost per injury claim
- the Dollar Costs in total
- the average Dollar Cost per injury claim

Dollar costs are an easily available but only partial measure of the overall impact of work injuries. Information on both direct cost and indirect cost measures of work injuries can help to make decisions and should be included in any analysis of impact. (See Appendix D.)

The "Average" Days of Temporary Total Compensation column in Table 7 shows this. This column provides a striking comparison between the average number of Days Lost per claim in the Ontario smelting and refining industry and in other primary metal industries. While the number of claims in smelting and refining were relatively small, this industry group had a severity measure almost double the average for all primary metal industries.

Table 7 - **WCB of Ontario, Compensation Claims Initially Settled in 1987,** Number of Fatal & Non-Fatal Claims and Working Days Lost by Industry

		Days of Temporary Total Compensation	
Industry	**Number of Claims Total**	**Days**	**Average**
Iron and Steel Mills	2,709	114,208	25
Steel Pipe and Tube Mills	301	10,129	34
Iron Foundries	940	24,036	26
Smelting and Refining	**116**	7,988	**69**
Aluminum Rolling Casting and Extruding	330	11,563	35
Copper and Copper Alloy Rolling Casting and Extruding	230	6,250	27
Metal Rolling Casting and Extruding	687	21,843	32
Primary Metal Industries	5,313	196,017	37

Source: Report S57102N2. Ontario Workers Compensation Board. December 1, 1988. Pg. 5.

Fatalities

Generally speaking, Fatality Rates for traumatic injuries are more accurate than Lost-Time or Disabling Injury Frequency Rates for traumatic injuries. This is because there is normally very little doubt about whether a death is work related or not.

Disabling injury and illness counts can be inaccurate. This inaccuracy is due to the possibility of inconsistent methods of counting, defining or classifying injuries. It is also due to there being more than one system of compensating workers for injury and sickness.

On the other hand, Fatalities due to Diseases or Illnesses are generally not expected to be representative of the actual incidence. Occupational diseases and illnesses often take a long time to show up,

and a long time to be recognized and accepted for compen- sation. Sometimes, as with the lung cancer claims from Ontario gold miners, it takes many years before Fatal Disease and Illness claims are settled by the WCB and recorded in official reports.

Although the statistics on job-related Fatalities can be trusted to be fairly accurate, different kinds of Fatality counts occur. Some indicate how many WCB claims were accepted for compensation in a year. Others indicate how many workers actually died on the job in a particular year. Expect to find slight variations in the totals from different sources of information.

For a brief analysis of Fatality Rates in Canada (1982-1986), see the CCOHS Statistics Infogram 02 (1989). Also helpful for detailed case reports and recommendations for prevention is the CCOHS Fatality Reports data base on CCINFOdisc. The 1990 Labour Canada publication *Employment Injuries and Occupational Illnesses* is also a unique source of Fatality statistics information.

5. HOW TO READ WORK INJURY STATISTICS WITH A CRITICAL EYE

Anyone using work injury statistics should pay careful attention to explanations in small print, definitions, labelling of tables, missing data and the potential for biased statements. This can help in two ways: it can avoid errors, and it can lead to important discoveries which may not be obvious from a quick reading.

Details

Some statistical reports on work injuries are not "user friendly." It is important to understand how the column headings and subheadings are organized. Some tables can be confusing. Sometimes the same table of numbers gives both counts and percentages. Readers must look for any special notes and explanations and read them carefully. If there are questions the data do not answer, list them to ask the author later.

Being a kind of "detail detective" can really make a difference in getting the greatest benefit from reading injury statistics reports. And the more of this type of experience members of health and safety committees have, the more they may be able to choose what types of injury records and statistics are most useful for their needs.

Table 8 is a simple but interesting set of numbers which might be misunderstood if not read carefully. It provides both numbers and percentages. Attention to key details, such as those highlighted on the table, can lead to a clearer understanding of the statistics. The highlighted items are discussed in the points below the table.

Table 9 - **Fatalities *Investigated* by the Occupational Health and Safety Division by AcciDent Type: Construction Industry and All Other Industries** - Alberta, 1977-1986

Accident Type	Construction Industry #	Construction Industry %	All Other Industries
Fall from elevation	53	**30.5**	**10.9**
Caught in, under, or between	33	19.0	14.5
Industrial motor vehicle	31	17.8	11.4
Struck by	27	15.5	26.5
Electric current contact	13	7.5	8.1
Highway motor vehicle	9	5.2	6.7
Contact toxics	1	0.6	12.5
Other	6	3.4	1.9
Unknown	1	0.6	7.5
Total	**174**	100.0	100.0

23%

Source: Alberta Occupational Health and Safety Division Fatality Investigation Data Base, 1977-1986.

- These are only the fatalities *investigated* by the OH&S Division. Questions readers might ask would be: Are these all the fatalities, or just the ones which were investigated? What makes these fatalities different from others? In fact, the fatality statistics on this table do *not* include fatalities arising from heart attacks, most highway, rail and air transport mishaps, and federal jurisdiction accidents.
- 1977-1986—The 174 construction industry fatalities are the total for a 10-year period, not for one year as it might seem at first glance.

- Industrial Motor Vehicle and Highway Motor Vehicle accidents are both shown, but in separate categories. Some other provinces' reports show only one category for motor vehicle accidents. The combined total of 40 deaths, or 23% of the total, might lead to the impression that industrial motor vehicle training and handling is critical for construction workers.
- The Accident Type categories appear in top-to-bottom order from the greatest number to the smallest number of construction fatalities.
- Falls from elevations in the construction industry in Alberta for the years 1977-1986 accounted for 30% of all construction fatalities. For all other industries, falls accounted for about 10% of fatalities. As the report's text states, "compared to fatalities in other industries, construction fatalities were almost three times more likely to be a result of a fall from an elevation."

Inclusions and Exclusions

Often the most important thing to figure out is who or what the numbers include, and who or what they do not include. Reports and even scientific studies often do not explain this clearly. The definition of a job category or even an employee can vary.

For example, who is counted as a construction worker can vary, depending on which definition an organization uses. Tradespeople and contractors working on construction sites are not always counted as construction workers. In the same province, one government organization counts travelling-to-and-from job site injuries as work-related while another organization does not.

Missing Links

Missing a key piece of information is sometimes called an "error of omission." This kind of oversight can change the end result, and can interfere with a clear understanding of a report. Readers are advised to read all the small print, no matter how insignificant it may look.

Here is an example of this problem. The National Work Injuries Statistics Program gathers statistics from WCBs, but not every WCB can supply the data using the same codes as the others, for every year or for every injury description.

The NWISP *Work Injuries* publication points this out in very small print on every page: "Except for the TOTAL line, the totals do not include data from all Boards." The following Total column for one occupational category shows how a reader may get a mistaken impression of the national total for this category. This would happen if s/he does not read the small print and realize that injury counts for 1986 and 1987 for Quebec are missing.

Table 9 - **Number of Accepted Time-Loss Injuries, by Occupation and Province**

Occupation		Total for Canada
Materials Handling and Related Occupations	1985	46,152
	1986	24,111
	1987	23,560

Source: Partial representation of much larger table, (Table 7), in *Work Injuries (1985-87)*, Statistics Canada, Catalogue 72-208, 1988.

Readers looking only at the Total for Canada column may interpret the drop in the years 1986 and 1987 as a real decrease in the total number of Time-Loss Injuries in the Materials Handling Occupations. It is not.

If readers are careful and read all the introductory notes about symbols, and if they see the note at the bottom of each page, they might figure this out for themselves.

Bias

Organizations may be biased in interpreting their record of successes or failures in a way which interferes with accurate assessments.

Here is an example of this type of bias. An industry safety association presented 23 years of Fatality statistics in one table. The change from 72 deaths on the job in 1966 to 39 in 1988 was certainly striking. The association praised the industry for this 64.5% drop in the Fatality Rate.

However, a closer look at all the numbers reveals that 1966 had the worst Fatality Rate of all 23 years—35.5 per 100,000 workers. In 1967 the Fatality Rate dropped to 23.1, then in 1968 to 17.1, and so on.

In 1988, the Fatality Rate was 12.6 per 100,000. This rate was a decided drop from

20 years previously, but not as dramatic a drop as the association chose to show.

The bias to watch for here is the choice of 1966 as the base year (in this case, the worst year) on which the organization developed comparisons. To be fair, the association admitted the industry had recently reached a "stagnation level" in preventing fatalities. But the table of statistics accompanying the text was chosen to give the most positive picture.

6. CONCLUSION

Work injury statistics which are clear, accurate, and descriptive of important facts are essential tools in deciding which health and safety problems or occupational groups need the most urgent attention. They can give the development of injury prevention programs a more rational basis and a greater chance of having some beneficial effect. However, many work injury statistics reports are incomplete and hard to understand.

This publication attempts to explain what work injury statistics are, where they are available, and which types can be most useful. Health and safety committees trying to analyze and prevent work injuries can make use of ideas in this publication. It can help them to find important statistics, to prepare their own reports, and to raise questions about the meaning and value of the injury statistics they come across in their work.

For more information, you may contact the Inquiries Service at the Canadian Centre for Occupational Health and Safety (CCOHS). This service responds to several hundred inquiries on a wide range of OH&S statistics topics every year.

More publications on work injury statistics topics are being prepared by CCOHS technical staff. If readers have any specific topics they would like to see addressed, or if they have comments to make on this publication, they are welcome to contact the author, Wendy King, at CCOHS.

Readers may also consult the articles listed in the Further Reading section at the end of this publication.

CCOHS organized four Workshops on Occupational Health and Safety Statistics in 1988-89. The proceedings are available in both English and French, from CCOHS.

APPENDIX A

Definitions

The following list is a selection of definitions published in Labour Canada's 1990 edition of *Employment Injuries and Occupational Illnesses* (1985-1987). Some have been slightly amended from the original. They may differ somewhat from those used by other organizations.

Accident (Industrial)

An unexpected or unplanned event that results in an injury, property damage or material loss at a workplace.

Days of Disability (Days Lost)

The total of full calendar days (or working days) on which the injured person was unable to work as a result of a temporary disability. The total does not include the day the injury occurred or the day the injured person returned to work, but it does include all intervening calendar days (including Sundays, days off, or plant shutdowns). It also includes any other full days of inability to work because of the specific injury, subsequent to the injured person's return to work.

Disabling Injury

Any "work injury" (including a fatality) that:

a) prevents an employee from reporting for work or effectively performing all of the duties connected with his/her regular work on any day subsequent to the day on which the injury occurred whether or not that day was a holiday or other non-working day; or

b) results in the loss by an employee of a body member or part thereof or in a complete loss of its usefulness or in the permanent impairment of a body function whether or not the employee is prevented from reporting for work or effectively performing his/her regular work as described in paragraph (a).

Fatality

An accident resulting in death.

Fatality Incidence Rate

Number of work-related deaths (including deaths arising from occupational illnesses) per 100,000 workers.

Disabling Injury Frequency Rate (Disabling injuries per million person-hours worked)

Number of disabling injuries x 1,000,000 divided by number of person-hours worked = Disabling Injury Frequency Rate

Incidence Rate

Injuries per 100 workers or employees calculated by the following formula:

Number of injuries x 100 divided by the average number of full-time workers or employees for the period = Incidence Rate

Incident (Industrial)

An unexpected or unplanned event that, except for fortuitous circumstances, could have resulted in an injury, property damage or material loss at workplace (see definition of accident).

Lost-Time Injury

A lost-time injury is usually the same as a disabling injury but, in some jurisdictions, where a waiting period must elapse before compensation for loss of wages is paid, it may be interpreted as a compensable injury and would exclude disabling injuries with loss of time less than the waiting period.

Medical-Aid Injury

Any "minor injury" for which medical treatment was provided and the cost of which was incurred by the Workers' Compensation Board of the province where the injury took place.

Non-Disabling Injury (Minor Injury or Medical-Aid Injury)

Any "work injury" for which either first aid or medical treatment was provided that was not a "disabling injury."

Occupational Illness

Any abnormal, debilitating condition of the body or mind, other than physical injury, suffered by an employee as a result of the work environment or physical activities performed in the course of employment.

Person-Year

The labour of one person in one normal working year. Equivalent to one full-time worker or one full-time employee.

Severity Rate (called "Accident Severity Rate" by Labour Canada)

The number of days charged per million person-hours worked. The formula is as follows:

Days charged x 1,000,000 divided by total person-hours worked = Severity Rate.

"Days charged" is the total compensation for Fatalities and Permanent Disabilities and the actual days lost for other "disabling injuries."

Work Injury

Any injury, disease, or illness incurred by an employee in the performance of or in connection with his or her work.

APPENDIX B

Industry Health and Safety Associations

These are just a few examples of industry-based associations in Canada that may provide or publish useful statistics on work injuries and illnesses. This not a complete list of organizations of this type.

- Association de sécurité des pâtes et papiers du Québec
- Association sectorielle transport et entreposage
- Canadian Electrical Association
- Canadian Hospital Association
- Construction Safety Association of Ontario
- Council of Forest Industries of British Columbia
- Electrical Utilities Safety Association
- Forest Products Accident Prevention Association
- Health Care Occupational Health and Safety Association
- Industrial Accident Prevention Association
- Mines Accident Prevention Associations
- Ontario Mining Association
- Ontario Pulp and Paper Makers Safety Association
- Québec Asbestos Mining Association
- Québec Metal Mining Association
- Provincial Safety Councils/Leagues
- Retail Accident Prevention Association
- Transportation Safety Association

APPENDIX C

Rates: Basic Calculation Methods

$$\text{INCIDENCE RATE} = \frac{\text{number of injuries x 100 percent}}{\text{average number of full-time employees}}$$

The incidence rate is usually expressed as the number of accidents or injuries per 100 employees.

$$\text{FREQUENCY RATE} = \frac{\text{number of injuries x 1,000,000}}{\text{employee-hours worked/exposure}}$$

The frequency rate is often given as disabling injuries per 1,000,000 employee-hours worked, or per 1,000,000 employee hours of exposure. This is often called the LOST-TIME or DISABLING INJURY FREQUENCY RATE.

$$\text{SEVERITY RATE} = \frac{\text{working days lost x 1,000,000}}{\text{employee-hours worked}}$$

There are different ways of measuring the severity of work injuries. One possibility is to use the number of working days lost (or charged) due to a compensable injury. In some cases, 200,000 instead of 1,000,000 may be used in this formula.

A count of the average number of working days lost due to injury can serve as a relative measure of severity, when compared with other types of injury or with other occupational categories. This is sometimes called the SEVERITY INDEX.

APPENDIX D

Accident Costs

This is an excerpt from *Industrial Accident Costs (1969-1979)*, Occupational Safety and Health Branch, Labour Canada, March, 1983.

A. Direct Costs

The words "Direct Costs" have been used to mean money paid out by provincial Workers' Compensation Boards in the settlement of compensation claims.

B. Indirect Costs

"Indirect Costs" include the losses suffered by the business concern apart from the compensation claims. These include the following items.

1. Cost of wages paid for working time lost by workers who were not injured.
2. The net cost to repair, replace, or straighten material or equipment that was damaged in an accident.
3. Cost of wages paid for working time lost by injured workers other than workers' compensation payments.
4. Extra cost due to overtime work necessitated by an accident.
5. Cost of wages paid to supervisors during time required for activities necessitated by an accident.
6. Cost of wages due to decreased output of an injured worker after return to work.
7. Cost of learning period of new worker.
8. Uninsured medical cost borne by the company.
9. Cost of time spent by higher supervisors and clerical workers on investigations or in the processing of compensation application forms.
10. Unusual miscellaneous costs.

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